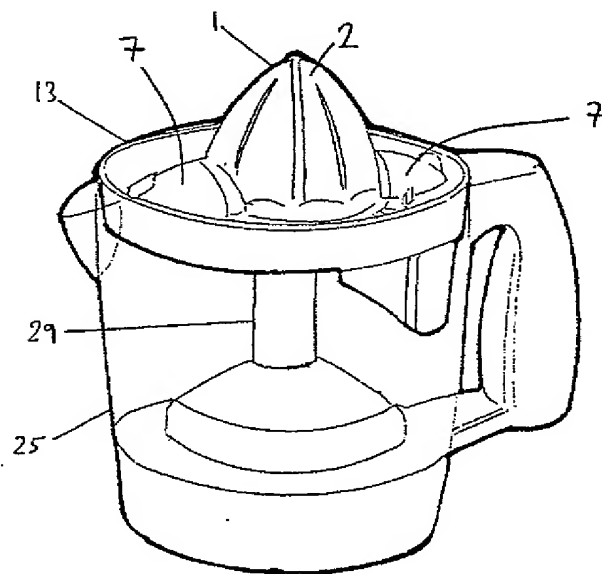


(12) UK Patent Application (19) GB (11) 2 360 933 (13) A**(43) Date of A Publication 10.10.2001****(21) Application No 0008686.8****(22) Date of Filing 07.04.2000****(71) Applicant(s)****Ka Nam Peter Ho
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9/02 9/20****ONLINE: WPI, EPODOC, JAPIO****(54) Abstract Title****A juicer comprising a reamer and a press plate**

(57) A reamer 1 for use with a press plate 13, the reamer comprising a rotatable reaming portion 2 and at least one arm 7 extending radially outwardly from the reaming portion 2 in a direction substantially orthogonal to the axis of rotation of the reaming portion 2. The press plate 13 has an upper surface (14, Fig. 3) having an aperture (18, Fig. 3) at an edge thereof comprising an entrance to a collector (20, Fig. 3). The reamer and press plate can be combined and incorporated into a juicer comprising a base with a motor and a drive shaft (29) extending upwardly through a juice collection jug 25 and engaging the reamer 1. The reaming portion 2 may be domed and the reamer 1 may have two arms 7 which comprise a lobe where the upper surface is curved and smooth and have fin at there distal end. The collector may have pores which allow the passage of liquid but not solids. The press plate may further comprise a plunger (26, Fig. 7)

Figure 6**GB 2 360 933 A**

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Figure 1

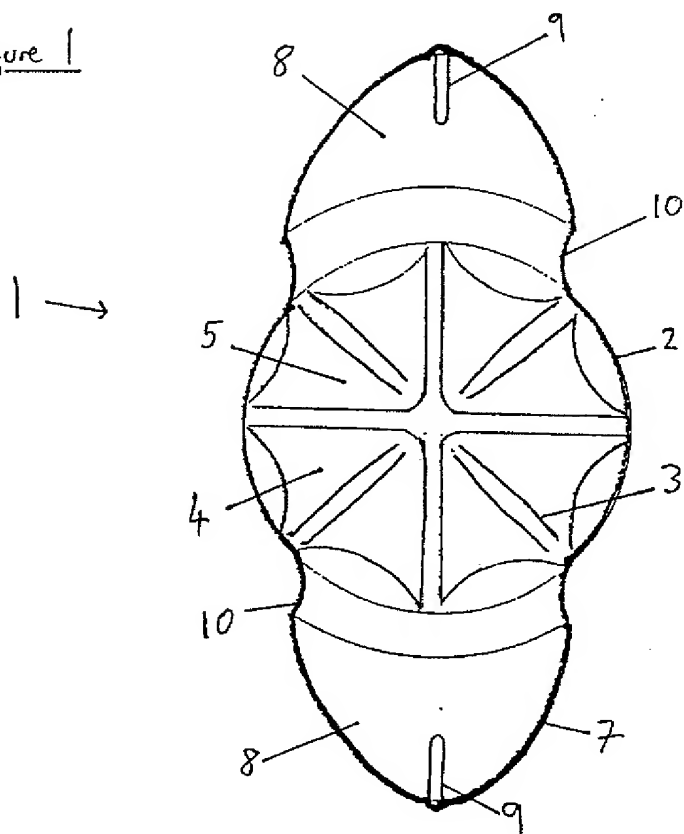
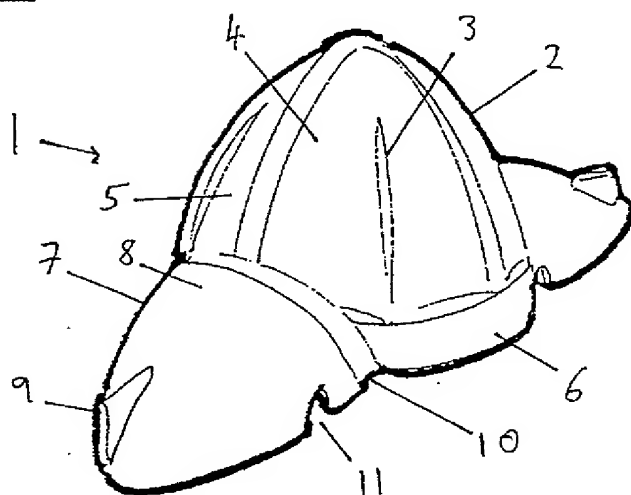


Figure 2



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Figure 3

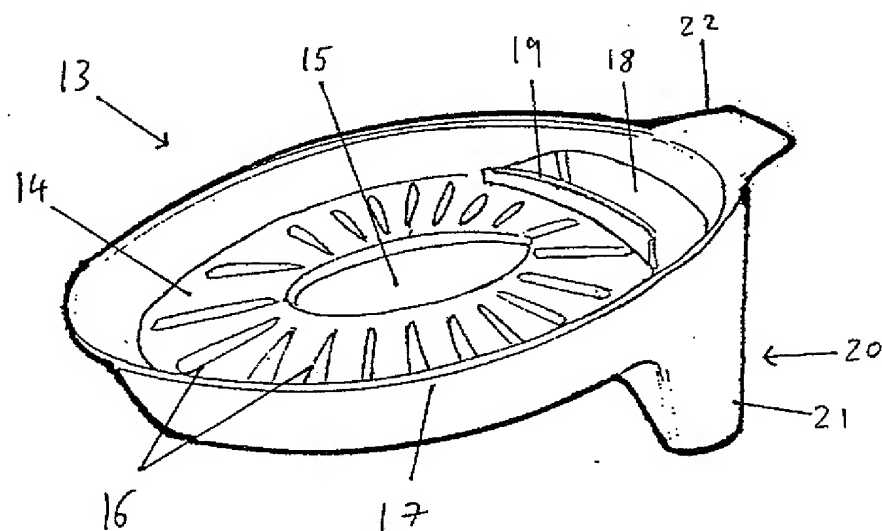
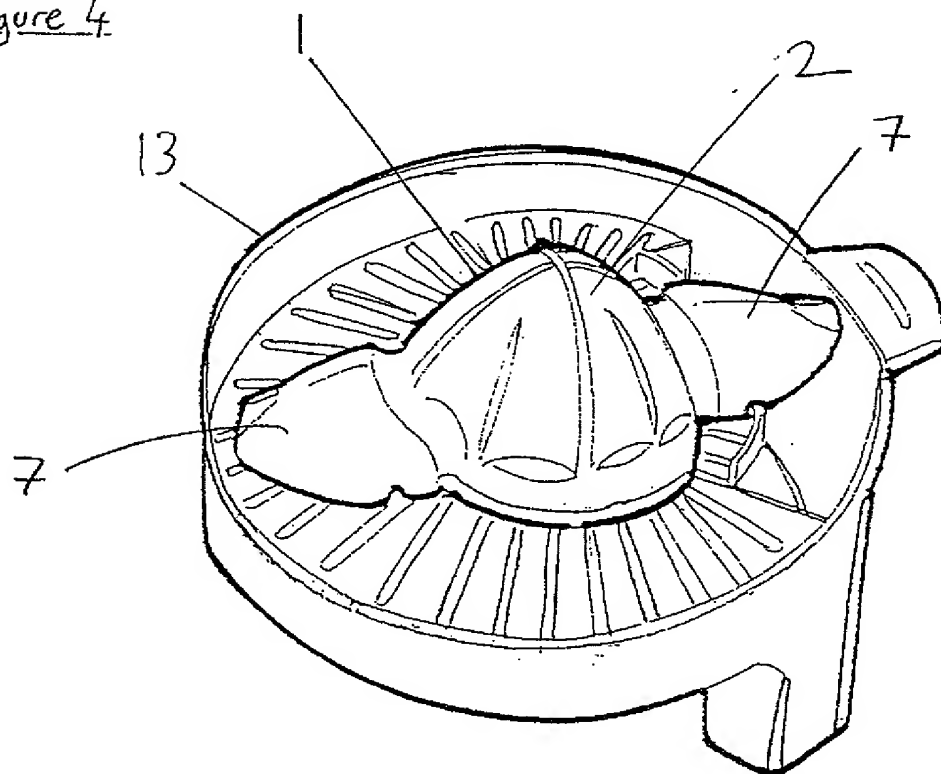


Figure 4



$\frac{3}{4}$

Figure 5

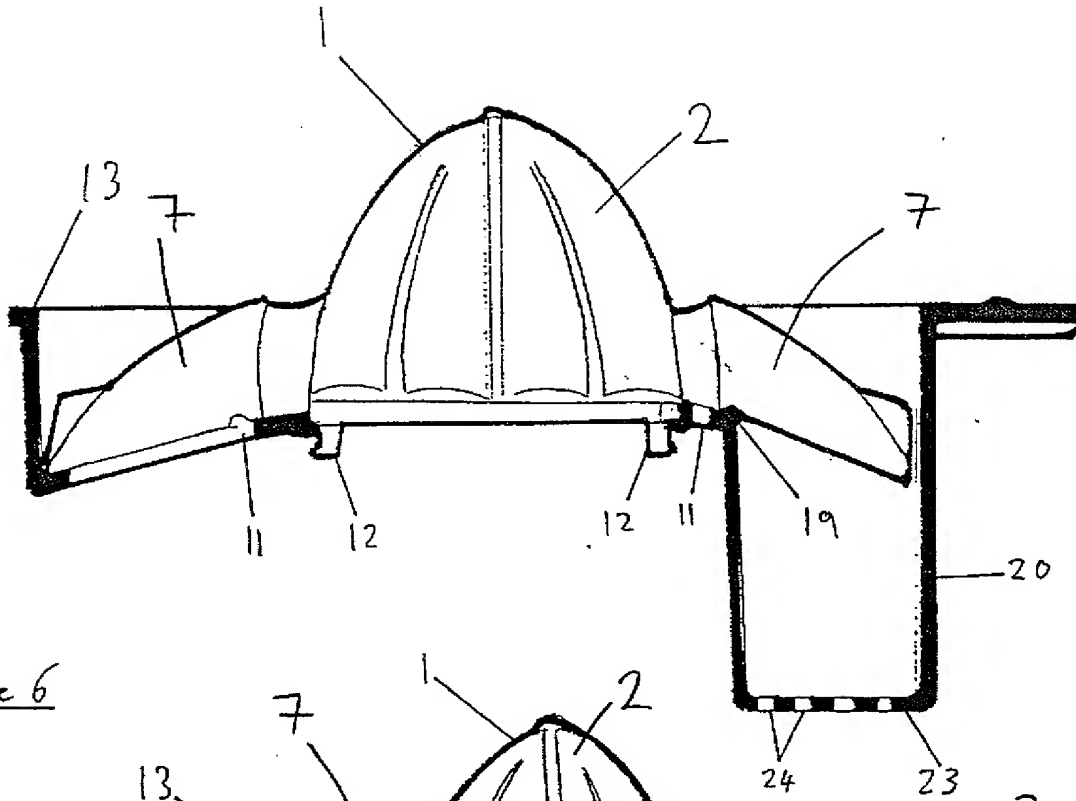
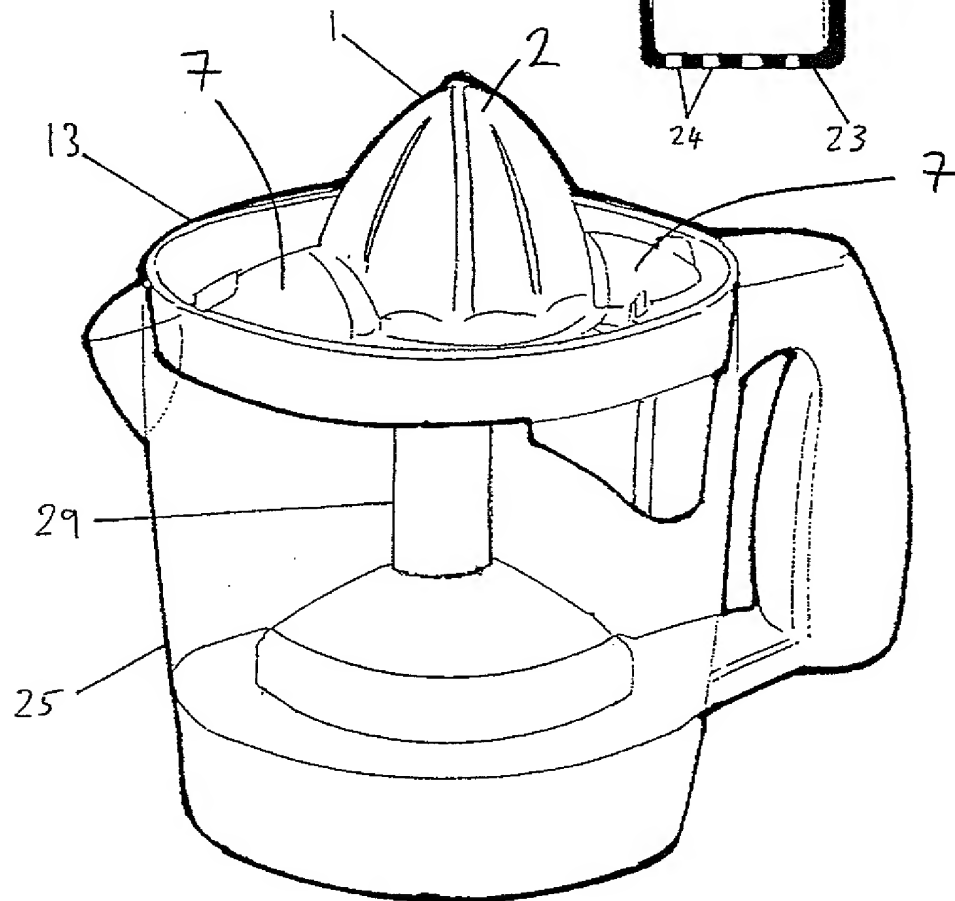
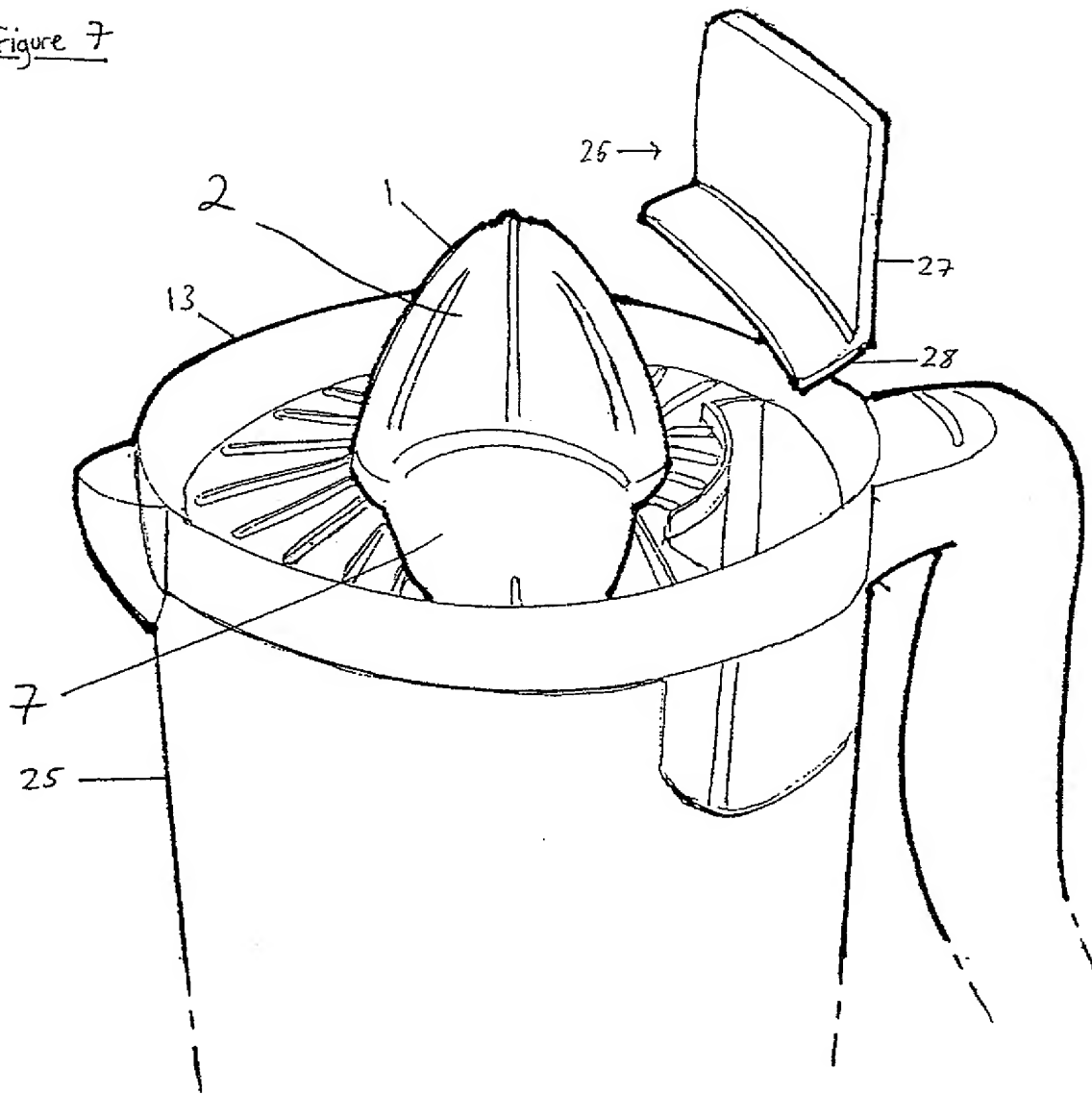


Figure 6



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Figure 7



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“Improvements in or Relating to Juicers”

THIS INVENTION relates to juicers, and in particular to a reamer and press plate that can be employed with existing juicers.

A juicer is a machine that extracts the juice from fruit, usually citrus fruit.

Conventionally, an essential feature of a manual juicer is a ribbed or otherwise textured dome, comprising a reamer. The reamer is dimensioned such that half of a citrus fruit or the like may be placed thereon thereby presenting the flesh of the fruit to the reamer. The fruit is then pushed downwardly onto the reamer and rotated. The relative motion of the flesh of the fruit and the reamer squashes juice from the fruit and at least partly shreds away the pulp and seeds from the peel. The peel is then removed.

Often, the reamer is provided integrally with a circular dish which has a raised lip running around its edge. The pulp, seeds and juice of the fruit collect in the annular channel defined between the lip and the reamer. The juice may be poured from the channel by means of a spout provided in the raised lip, leaving the majority of the pulp and seeds in the channel.

Electrically powered juicers are also available which have a drive mechanism for rotating the reamer on a base adapted to collect juice.

However, both manual and powered juicers suffer from the drawback that substantial quantities of juice remain in the pulp left in the channel.

A further drawback of conventional reamers is that the regular profile of the reamer causes little disturbance of the fruit being pressed and does not produce the maximum volume of juice from the fruit.

Another drawback of powered juicers is that the constant rotation of the reamer does not disturb the flesh of the fruit sufficiently to allow the maximum volume of juice to be extracted.

It is an object of the invention to seek to provide a reamer and press plate for use with a juicer to alleviate the above drawbacks.

Accordingly, one aspect of the present invention provides a reamer for use with a press plate, the reamer comprising: a rotatable reaming portion having an axis of rotation; and at least one arm extending radially outwardly from the reaming portion in a direction substantially orthogonal to the axis of rotation of the reaming portion.

Advantageously, an upper surface of the reaming portion is domed.

Preferably, the domed reaming portion has a substantially circular base.

Conveniently, the upper surface of the reaming portion is peaked.

Advantageously, the upper surface of the reaming portion comprises elongate ribs and grooves.

Preferably, the at least one arm comprises a lobe.

Preferably, the reamer has a substantially semicircular channel at the junction of the at least one lobe and the reaming portion.

Conveniently, an upper surface of the or each arm is curved.

Advantageously, the upper surface of the or each arm is smooth.

Preferably, the reamer has an arcuate slot in a lower surface of the or each arm, the centre of arc of the slot being the axis of rotation of the reamer.

Conveniently, the or each arm has a fin on a distal end thereof.

Advantageously, the or each fin has a distal edge that is substantially perpendicular to the axis rotation of the reaming portion, and which is substantially level with the distal end of the arm.

Preferably, the reamer has two arms.

Another aspect of the present invention provides a press plate having: an upper press surface having an aperture at an edge thereof; and a collector depending from the press plate, the aperture comprising an entrance to the collector.

Conveniently, the upper press surface is substantially circular.

Preferably, the aperture is arcuate, the curvature thereof corresponding substantially to the curvature of the press plate.

Advantageously, the upper press surface comprises a conical surface having a plurality of elongate slots.

Preferably, the reamer has a raised barrier adjacent to the aperture.

Conveniently, the raised barrier is on the side of the aperture nearest the centre of the press plate.

Advantageously, the reamer has a raised collar extending around the perimeter of the press surface.

Preferably, the reamer is further provided with a handle mounted on the raised collar.

Conveniently, the collector has pores in a lower surface thereof.

Advantageously, the pores allow liquid to pass therethrough but do not allow solids to pass therethrough.

Preferably, the reamer is further provided with a plunger.

Conveniently, the plunger has a pressing portion of substantially equivalent dimensions to an internal surface of the collector.

Advantageously, the plunger is dimensioned to be received in a slide fit in the collector.

Preferably, the plunger is removable from the press plate.

Conveniently, registration means are located on the reamer and the press plate to locate the reamer with respect to the press plate to allow relative rotational

motion of the reamer with respect to the press plate when the reamer and the press plate are so registered.

Advantageously, the registration means comprise: a substantially circular lip depending from a lower surface of the reamer, the lip having an outwardly extending rim; and a substantially circular central hole in the press plate, the lip and the hole journalling the reamer and the press plate to one another.

Preferably, the at least one arm rests substantially on the press surface and a distal end of the arm rests at an edge of the press surface.

Conveniently, the raised barrier passes through the arcuate groove on the underside of the at least one arm when the reamer rotates with respect to the press plate.

A further aspect of the present invention provides a juicer having: base with a motor therein; a juice collection volume having an upper opening, the juice collection volume being located on top of the base; a drive shaft extending upwardly from the motor through the juice collection volume; and a reamer and a press plate according to the above.

Advantageously, the drive shaft engages the reamer.

Preferably, the drive shaft rotates thereby causing rotation of the reamer with respect to the press plate.

Conveniently, the rotation of the drive shaft is alternately clockwise and anticlockwise.

Advantageously, the press plate substantially covers the upper opening of the juice collection volume.

In order that the present invention may be more readily understood, embodiments thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a plan view of a reamer embodying the present invention;

Figure 2 is a perspective view of the reamer of Figure 1;

Figure 3 is a perspective view of a press plate embodying the present invention;

Figure 4 is a perspective view of the reamer of Figure 1 with the press plate of Figure 3;

Figure 5 is a side view of the reamer of Figure 1 with the press plate of Figure 3 being shown in cross section;

Figure 6 is a perspective view of a juicer incorporating the reamer of Figure 1 and the press plate of Figure 3; and

Figure 7 is a perspective view of the juicer of Figure 6 with a plunger embodying the present invention.

A juicer for use with the present invention comprises a jug having a handle and a spout. The jug has a motor in the base thereof, and a drive shaft extending upwardly from the base substantially through the centre of the jug. The drive shaft terminates approximately level with the top of the jug. A press plate

covers the top of the jug, and a reamer rests on top of the press plate, engaging and being driven by the drive shaft through a central aperture in the filter.

Turning to Figures 1 and 2, a reamer 1 embodying the present invention comprises a central dome 2. The dome 2 is peaked and is suitably dimensioned so that half of an ordinary-sized citrus fruit may be placed thereon, with the fleshy part of the fruit facing downwards. The central dome 2 has a contoured outer surface which is provided with a series of radially extending elongate ribs 3 and grooves 4 which run down the outer surface 5 from the peak of the dome 2 to the base 6 of the dome 2.

The dome 2 is further provided with two arms, in the form of radial lobes 7, which extend radially outwardly from the circumference of the base of the dome 2 in opposite directions to one another.

Each radial lobe 7 has a smoothly rounded upper surface 8 which adjoins with the outer surface of the dome 2 along a semicircle passing from the base 6 of the dome 2 to a high point which is approximately one-third of the height of the dome 2 and then back down to the base of the dome 2. Each lobe 7 has a substantially flat lower surface that slopes downwardly away from the central dome 2. A raised fin 9 is provided on the upper surface 8 of each radial lobe 7 and comprises an upright planar surface which extends radially away from a tip of the lobe 7 toward the centre of the dome 2. One edge of the fin 9 rises substantially perpendicular to the longitudinal axis of the dome 2 from the tip of each lobe 7.

An arcuate channel 10 is provided along the intersection of the dome 2 and each radial lobe 7.

An arcuate groove 11 is provided on the lower surface of each radial lobe 7, the centre of arc of which is the centre of the dome 2.

A recess is provided at the centre of the underside (not shown) of the reamer 1. The recess is intended to receive a drive shaft of a juicer motor.

The underside of the reamer 1 is also provided with an annular lip 12 (see Figure 5) which depends from the base of the dome.

Figure 3 shows a press plate 13 for use with a juicer embodying the present invention. The press plate 13 is substantially circular in shape, and has a frusto-conical upper press surface 14 which slopes downwardly away from the centre, and which has a central hole 15 therethrough. The central hole 15 is dimensioned to receive the annular lip 12 in slide fit engagement to journal the reamer 1 to the press plate 13. The press surface 14 is provided with a number of elongate slots 16 thereon, extending radially from the centre of the press surface 14 of the press plate 13. The slots 16 are of appropriate width such that juice may pass therethrough but pulp and seeds may not. A raised collar 17 extends around the circumference of the press surface 14.

The press plate 13 is further provided with an arcuate aperture 18 at one edge of the press surface 14 thereof. A raised lip 19 is provided along an inner edge of the aperture 18 nearest the centre of the press surface 14.

The press plate 13 is provided integrally with an elongate collector 20 that depends downwardly from the aperture 18. The aperture 18 is thus the opening to the collector 20. The collector 20 has solid side walls 21 which define a chamber of the same cross-sectional shape as the aperture 18. The press plate 13 is further provided with a handle in the form of a thumb tab 22, which is

mounted on the raised collar 17 and which extends radially away from the centre of the press surface 14 of the press plate 13.

Figures 4 and 5 show the reamer 1 located on top of the press surface 14 of the press plate 13 with the annular lip 12 of the reamer journalled in the central hole 15 of the press plate 13, the reamer 1 resting on the press surface 14 of the press plate 13. When the reamer 1 and the press plate 13 are placed together in this way, the upright edges of the fins 9 of the radial lobes 7 lie adjacent the outer collar 17. The slope of the lower surfaces of the radial lobes 7 matches the slope of the frusto-conical press surface 14 of the press plate 13, so that the lower surfaces of the radial lobes 7 rest flush against the press surface 14.

The arcuate groove 11 in the lower surface of each lobe 7 is positioned such that as a lobe 7 passes over the aperture 18, the raised lip 19 of the press plate 13 passes through the respective groove 11.

The lower surface 23 of the collector 20 is provided with a plurality of pores 24, which are suitably dimensioned to allow juice to pass, but to retain solids such as pulp and seeds.

Figure 6 shows the reamer 1 and the press plate 13 when placed on a jug 25. The press plate 13 covers the upper opening of the jug 25.

Referring now to Figure 7, the juicer is provided with a plunger 26 which comprises an elongate arcuate back 27 and an arcuate foot 28, the foot 28 being orthogonal to the back 27. The back 27 is shaped such that the curvature thereof matches the curvature of the outer edge of the arcuate aperture 18 defining the opening to the collector 20. The foot 28 is shaped such that it conforms to the shape of the lower internal surface 23 of the collector 20.

In use, the press plate is placed on top of the jug 25 so that the top opening of the jug 25 is covered by the press plate 13. The reamer 1 is then located on the filter 13 locating the end of the drive shaft 29 in the recess on the underside of the reamer 1.

Half of a citrus fruit is placed on top of the dome 2 of the reamer 1, with the fleshy part of the fruit facing downwards, as described above. The outer skin of the fruit is then gripped by the user, and pushed down while the reamer 1 rotates. The ribs 3 and grooves 4 of the dome 2 cause the pulp of the fruit to be shredded by this action, and the pulp, seeds and juice of the fruit to fall onto the press surface 14 of the press plate 13. The smoothness and curvature of the radial lobes 7 of the reamer 1 prevent parts of the fruit adhering to the upper surfaces 8 of the lobes 7 and also serves to intermittently lift parts of the fruit from the dome thereby disturbing the fruit and facilitating juice extraction. Juice running down the sides of the dome 2 towards the radial lobes 7 flows into the channels 10 adjacent the lobes 7, and runs onto the press surface 14. The juices passes through the pores 24 in the lower surface 23 of the collector 20 and into the jug 25.

Once no more pulp, seeds and juice can be extracted from the fruit by this method, the fruit is removed from the central dome 2.

As previously described, the raised lip 19 of the press plate 13 does not present an obstacle to rotation of the reamer 1 with respect to the press plate 13, as the arcuate grooves 11 on the lower surface of each lobe 7 pass over the lip 19 as the lobe 7 passes over the aperture 18. The lip 19 acts as a barrier as the fruit is being pressed onto the dome 2, and helps to prevent pulp and seeds from falling

directly through the aperture 18 thereby maximising the time which juice-bearing pulp remains on the press surface 14 being pressed on by the lobes 7.

Preferably, the drive shaft can rotate first in one direction for a predetermined period of time and then in the opposite direction for a similar length of time. This rotational motion of the reamer 1 back and forth with respect to the press surface 14 of the press plate 13 agitates the flesh of the fruit and serves to extract more juice than simple unidirectional rotation. Juice remains in the pulp which has been reamed from the fruit and which now rest on the press surface 14 of the press plate 13. This juice is extracted by the sweeping motion of the radial lobes 7 which pass over and press onto the pulp on the press plate, thereby squashing the pulp. The juice is pressed out, and can flow into the collector 20, and hence into the jug 25. Juice resting on the press surface 14 may also be pushed into the collector 20 by the sweeping motion of the lobes 7, or may pass through the slots 16.

When no further juice can be extracted from the pulp by the above method, the plunger 26 is used to press any remaining juice from the pulp in the collector 20 into the jug 25. The user grips the back 27 of the plunger 26, and inserts the foot 28 of the plunger 25 into the collector 20. The back 27 of the plunger 26 is sufficiently long that the foot 27 may be pressed against the lower surface 23 of the collector 20 while the back 27 is gripped by the user. Hence, the user may use the foot 28 of the plunger 26 to press the pulp and seeds in the collector 20 against the lower surface 23 of the collector 20, thereby squeezing any remaining juice out of the pulp, through the pores 24 and into the jug 25. As described above, the pores 24 in the lower surface 23 of the collector 20 do not allow solids to pass, and so the pulp and seeds are retained in the chamber of the collector 20.

Once this is complete, the press plate 13 may be lifted from the jug 25, and the collector 20, which at this stage will contain crushed seeds and pulp, may be emptied and the contents disposed of. The jug 25 may be used to dispense the juice obtained from the fruit.

Although the above-described embodiment employs juicers that are electrically (or otherwise) driven, it is envisaged that the present invention will find use in manual extraction of juice from fruit. Reamers and press plates embodying the present invention may be provided separately or together to be applied to existing juicers, thereby obviating the need to purchase a new juicer or discard an existing one.

While the above embodiment comprises a reamer having two arms on opposite sides of the reaming portion, it is envisaged that many alternative designs of reamer may be employed with the present invention. For instance, the reamer could have three arms equispaced around the reaming portion, or four arms, each at right angles to the neighbouring arms. In addition, the arms need not be in the form of lobes, and may comprise simple sweeping surfaces, comb-like protrusions with the teeth facing downwards toward the press surface, or rollers which roll over the press surface as the reamer rotates.

In the present specification "comprise" means "includes or consists of" and "comprising" means "including or consisting of".

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any

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combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS:

1. A reamer for use with a press plate, the reamer comprising:
a rotatable reaming portion having an axis of rotation; and
at least one arm extending radially outwardly from the reaming portion
in a direction substantially orthogonal to the axis of rotation of the reaming
portion.
2. A reamer according to Claim 1, wherein an upper surface of the reaming
portion is domed.
3. A reamer according to Claim 2, wherein the domed reaming portion has
a substantially circular base.
4. A reamer according to Claim 2 or 3, wherein the upper surface of the
reaming portion is peaked.
5. A reamer according to any one of Claims 2 to 4, wherein the upper
surface of the reaming portion comprises elongate ribs and grooves.
6. A reamer according to any preceding claim, wherein the at least one arm
comprises a lobe.
7. A reamer according to Claim 6, having a substantially semicircular
channel at the junction of the at least one lobe and the reaming portion.
8. A reamer according to any preceding claim, wherein an upper surface of
the or each arm is curved.

9. A reamer according to Claim 8, wherein the upper surface of the or each arm is smooth.

10. A reamer according to any preceding claim, having an arcuate slot in a lower surface of the or each arm, the centre of arc of the slot being the axis of rotation of the reamer.

11. A reamer according to any preceding claim, wherein the or each arm has a fin on a distal end thereof.

12. A reamer according to Claim 11, wherein the or each fin has a distal edge that is substantially perpendicular to the axis rotation of the reaming portion, and which is substantially level with the distal end of the arm.

13. A reamer according to any preceding claim, having two arms.

14. A press plate having:
an upper press surface having an aperture at an edge thereof;
and a collector depending from the press plate, the aperture comprising an entrance to the collector.

15. A press plate according to Claim 14, wherein the upper press surface is substantially circular.

16. A press plate according to Claim 15, wherein the aperture is arcuate, the curvature thereof corresponding substantially to the curvature of the press plate.

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17. A press plate according to any one of Claims 14 to 16, wherein the upper press surface comprises a conical surface having a plurality of elongate slots.

18. A press plate according to any one of Claims 14 to 17, having a raised barrier adjacent to the aperture.

19. A press plate according to Claim 18, wherein the raised barrier is on the side of the aperture nearest the centre of the press plate.

20. A press plate according to any one of Claims 14 to 19, having a raised collar extending around the perimeter of the press surface.

21. A press plate according to Claim 20, further provided with a handle mounted on the raised collar.

22. A press plate according to any one of Claims 14 to 21, wherein the collector has pores in a lower surface thereof.

23. A press plate according to Claim 22, wherein the pores allow liquid to pass therethrough but do not allow solids to pass therethrough.

24. A press plate according to any one of Claims 14 to 23, further provided with a plunger.

25. A press plate according to Claim 24, wherein the plunger has a pressing portion of substantially equivalent dimensions to an internal surface of the collector.

26. A press plate according to Claim 24 or 25, wherein the plunger is dimensioned to be received in a slide fit in the collector.

27. A press plate according to any one of Claims 24 to 26, wherein the plunger is removable from the press plate.

28. A reamer according to any one of Claims 1 to 13 in conjunction with a press plate according to any one of Claims 14 to 27.

29. A reamer and press plate according to Claim 28, wherein registration means are located on the reamer and the press plate to locate the reamer with respect to the press plate to allow relative rotational motion of the reamer with respect to the press plate when the reamer and the press plate are so registered.

30. A reamer and press plate according to Claim 29, wherein the registration means comprise:

a substantially circular lip depending from a lower surface of the reamer, the lip having an outwardly extending rim; and

a substantially circular central hole in the press plate,

the lip and the hole journalling the reamer and the press plate to one another.

31. A reamer and press plate according to Claim 29 or 30, wherein the at least one arm rests substantially on the press surface and a distal end of the arm rests at an edge of the press surface.

32. A reamer and press plate according to any one of Claims 29 to 31, wherein the raised barrier passes through the arcuate groove on the underside of the at least one arm when the reamer rotates with respect to the press plate.

33. A juicer having;
 - a base with a motor therein;
 - a juice collection volume having an upper opening, the juice collection volume being located on top of the base;
 - a drive shaft extending upwardly from the motor through the juice collection volume; and
 - a reamer and a press plate according to any one of Claims 29 to 32.
34. A juicer according to Claim 33, wherein the drive shaft engages the reamer.
35. A juicer according to Claim 34, wherein the drive shaft rotates thereby causing rotation of the reamer with respect to the press plate.
36. A juicer according to Claim 35, wherein the rotation of the drive shaft is alternately clockwise and anticlockwise.
37. A juicer according to any one of Claims 33 to 36 wherein the press plate substantially covers the upper opening of the juice collection volume.
38. A reamer substantially as hereinbefore described, with reference to Figures 1, 2 and 4 to 7 of the accompanying drawings.
39. A press plate substantially as hereinbefore described, with reference to Figures 3 to 7 of the accompanying drawings.
40. A juicer substantially as hereinbefore described, with reference to Figures 6 and 7 of the accompanying drawings.

41. Any novel feature or combination of features disclosed herein.



Application No: GB 0008686.8
Claims searched: 1-13, 38

Examiner: Chris Archer
Date of search: 31 July 2001

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
 UK Cl (Ed.S): A4C (CLA)
 Int Cl (Ed.7): A47J (19/02, 19/06); A23N (1/00, 1/02); B30B (9/02, 9/20)
 Other: ONLINE: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2275415 A (KWONNIE) see in particular stirrers 12 in the figures	1-5, 11, 12, 28 & 33 at least
X	GB 1559146 (ZYLIS) see in particular wiper element 208 in figures 13	1-5, 28, 33 at least
X	GB 373904 (FROMM) see in particular handle 19 in the figures	1-5
X	US 6138556 (YU) see in particular reference numeral 611 in figures	1-5, 11, 28 & 33 at least
X	US 5193447 (LUCAS) see in particular reference numeral 26 in the figures	1-5, 28 & 33 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.